Cherish the Capacity to Change

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The following address was given at the Gold-Headed Cane Ceremony, University of California School of Medicine, on 3 June 1966. At this event on the eve of Commencement Day, the senior student who has been chosen by his classmates and professors in the Department of Medicine as the one who best exemplifies the qualities of a true physician is given a gold-headed cane. This carries on the English tradition of a cane which was passed from physician to physician from 1689 to 1825, and was carried successively by Drs. John Radcliffe, Richard Mead, Anthony Askew, David Pitcairn and Matthew Baillie. The original cane now rests in the Hall of the Royal College of Physicians in London.

FIRST LET ME EXPRESS to you how much I appreciate being invited to talk at your Gold-Headed Cane Ceremony. When I read the list of distinguished physicians who had delivered the previous addresses, I realized that I was honored indeed to follow such eminent members of the medical profession. It was my privilege to have known many of the speakers, one in particular, Dr. William J. Kerr, who initiated this Gold-Headed Cane Ceremony. I treasure my friendship with him which began in our days together in the Harvard Medical School. This ceremony is a splendid memorial to his success in reemphasizing the art of medicine in the care of the patient.

The Gold-Headed Cane itself gives us some intimate views of the art of medicine as practiced by the physicians who carried it. It was the art of medicine that they practiced, for the science of medicine was practically non-existent at that time. Therapy consisted of counter-irritants, bleeding, sweating, purging, cupping and blistering. Patients were bled as many as five times daily.

And for such ailments as pain in the shoulder the following two prescriptions were used: "*Rx*—Barley, liquorish, raisens; *Rx*—Emulsion of linseed oil, sugar candy, barley and crabs' eyes."

Plants, herbs and roots for therapeutic use were frequently grown by physicians in their own gardens. It is true that William Harvey in 1628 had demonstrated the circulation of the blood, and Linnaeus, Malpighi, Mayow, Lower, Lavoisier and Vieussens had published some of their pioneering works, and The Cane carriers must have been well aware of them, but a century was to pass before the significance of these experiments could be appreciated. Sydenham was just bringing out his treatise on the course and treatment of disease based on his own observations. He died as the Gold-Headed Cane began its autobiography in 1689 while in the hands of John Radcliffe.

Fortunately for them, all the carriers of The Cane were well off financially and were able to avail themselves of university educations. Richard Mead, for instance, traveled widely over the continent, studied at Utrecht and Leyden and got his degree of Doctor of Medicine at Padua. Anthony Askew likewise traveled extensively, spent money freely on rare manuscripts, studied at Leyden and got his M.D. degree at Cambridge. It doesn't require much imagination to draw the conclusion that they not only sampled but put to thorough test the best foods and wines of the countries in which they sojourned.

Having read how these scholarly physicians who carried the Gold-Headed Cane pursued their med-

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ical education, my curiosity was aroused about medical education in general in that day and how it managed to undergo such a complete change in order to arrive at its present state. What role were the medical schools and the hospitals of that time playing in medical education?

On the continent there were several well established universities with medical schools. In Italy, the first school was established at Salerno in the ninth century, to be followed by those at Bologna and Padua three centuries later. Then in 1231, by decree, Salerno was designated as the only school in Italy where medicine could be taught. In France at Montpellier, medicine in some form was taught as early as 1134. The hospital there, one of the earliest, was established in 1198 and anatomy was taught in 1285.

The University of Paris offered medicine in the Twelfth Century, and before a medical building was constructed in 1505, the Cathedral of Notre Dame was used for medical teaching.

In England, Oxford and Cambridge were founded probably in the Thirteenth Century, and the Scotch schools at St. Andrews, Glasgow and Aberdeen were established in the Fifteenth Century.

In Oxford and Cambridge medical "science" was taught, but only as a part of a general philosophical education. Eleven years were required to obtain an M.D. degree and the earliest one conferred at Oxford was given in 1312. What part of the 11 years had to be spent in residence is not clear, but medical students were able to travel and attend lectures on the continent. There was no hospital in either university. In fact, it is only comparatively recently that these schools have had hospitals for medical teaching.

In London, St. Bartholomew's and St. Thomas' Hospitals were founded in the Middle Ages but clinical lectures and clinical teaching were not permitted in them until the first part of the Eighteenth Century. Thus in the time of John Radcliffe and Richard Mead none of the English or Scotch medical schools was connected with hospitals.

Several forms of license could be sought in England. The license from the College of Physicians required a University degree, usually from Oxford or Cambridge. That of the Company of Barber Surgeons or the Society of Apothecaries required apprenticeship training.

In the early Seventeenth Century, attending surgeons at St. Bartholomew's or St. Thomas' Hospitals could bring their apprentices to observe. This gave the surgeons prestige and increased the number of applicants for apprenticeship. The fees which the preceptors charged were none too modest, sometimes reaching 500 guineas a term. St. Thomas' Hospital ruled in 1717 that apprentices should not be permitted to bring their friends into the hospital to view the dressing of patients.

There were in addition "walking pupils" who paid a fee to the hospital for being allowed the privilege of observing hospital practice for a month or two.

A university medical education consisted of Latin and Greek, and extensive readings in these languages, including the medical classics of Hippocrates, Rhazes, Galen and others. Medical teaching consisted chiefly of theoretical discourses or reading by the instructor from the classics. There was one course of 50 lectures on the "Aphorisms of Hippocrates" and endless discourses on "the fevers." The University M.D. degree so obtained was mostly for prestige, and only the well-to-do, with few exceptions, could afford it.

In some schools on the continent, a discourse was required for the degree of Doctor of Medicine. A formal public ceremony was held to accept the candidate into the dignified "medical corporation." The whole faculty marched in to the ringing of bells. The candidate's professor then reviewed and criticized the student's discourse, and the candidate took an oath that he would always fulfill his duties to the faculty and the whole medical profession. A doctor's hat was placed on his head and a ring on his finger to signify his knightly rank. A golden belt was fastened on him and a book of Hippocrates was opened before him. He was then invited to sit beside the President, who embraced him and conferred his blessing. The ceremony closed with the thanks of the new doctor, and was followed by a banquet offered to all members of the faculty. The expenses of this ceremony were paid by the candidate. This, in addition to the fees paid and the presents which were given to members of the faculty and to various persons, added to the costs of a medical education.

The Cane carriers had an education of the University type but, although thus armed, did little or nothing to advance medicine in their day. If they did not make such an effort, it could scarcely be

expected that those with more limited training and certainly with much less income would take the forward steps in this field.

By far the most common type of medical education in the Seventeenth and Eighteenth Centuries was that of the apprenticeship, which was shorter in duration and less expensive. Inasmuch as this was the only kind of medical education available in the American colonies, and was given by physicians coming from England, we might turn our attention to early medical education in our country.

In the Seventeenth Century when the London Company or the West India Company sent settlers to America, it made contracts with surgeons or apothecaries to accompany the settlers and take care of them for a given period. The New England Puritans were more inclined to turn to religious healers. Thus Deacon Samuel Fuller came on the Mayflower and attended the Pilgrims in Plymouth until he died in 1632. The Reverend Thomas Thatcher, of the Old South Church in Boston, issued the first printed medical document in the British Colonies. The subject was The Treatment of Small Pox.

Graduates from English universities read some of the medical classics in the course of their general education and were, therefore, sought after for medical advice. John Winthrop, the first governor of Connecticut, a graduate of the University of Dublin, was in frequent demand for such advice. In the British colonies those who administered to the sick were called "healers," while the Dutch referred to them as "comforters of the sick."

The trend in medical training in the colonies was determined to a great extent by the environmental demands. There were, of course, no medical schools and the apprentice system was used almost entirely to meet the demand for physicians, which increased as the colonies grew. The relatively few physicians from the old countries, either surgeons or apothecaries, had no difficulty in finding apprentices.

There were no requirements or standards for admission to an apprenticeship in the Seventeenth and Eighteenth Centuries and some of the apprenticeships were of only six months' duration. As would be expected, many abuses occurred, and the point was finally reached where, in Connecticut and Rhode Island, licenses were required. But no examination or any special requirements were necessary, and licensure was, therefore, ineffective. This state of affairs persisted almost without change well into the Eighteenth Century.

The general attitude of the public of that day is of interest. In Massachusetts the witchcraft court was dissolved in 1692 but witch hunting did not cease immediately and it raised its head at the time of a smallpox epidemic in Boston in 1721. The Reverend Cotton Mather, through reading the Philosophical Transactions of the Royal Society, had learned of the protection afforded against smallpox by inoculation of pus from the lesions of active cases. He persuaded Dr. Zabdiel Boylston to inoculate 250 persons. All but six of those who were inoculated recovered, whereas the uninoculated who caught the disease had a mortality of over 50 per cent. The public, apparently giving its attention to the deaths among the inoculated, raised a terrific hue and cry against Mather and Boylston. Their houses were stoned, the windows broken and they were insulted on the streets and threatened with death. Despite this, Boylston used the inoculation in the next epidemic in Boston, again with success.

The number of practitioners in the colonies increased with the demand, and the supply of medical help was said to be ample. So great was the competition that physicians coming from Europe, after graduating from medical schools with the best medical education available, in many instances were not successful as practitioners, as they were unable to compete with the healers, who charged low fees. As a result many of these medical school graduates went into business as merchants, to the great disadvantage of the standards of medical practice.

As the colonies grew, the demand for better care increased; more educated physicians came to serve as preceptors, and they were more exacting in their standards. Gradually the length of apprenticeship was increased, the requirements were made more exacting and the end product improved. The apprentice moved into the house of the local practitioner, his preceptor-to-be, and bound himself by legal contract to perform certain duties.

I should like to read you parts of a legal contract in which Hollister Baker bound himself as apprentice to Benj'n Gott, his preceptor, in Marlborough, Massachusetts, in 1734:

This Indenture Witnesseth, that Hollister Baker, a minor, aged about 16, son of Mr. Edm'nd Ba-

ker, late of Marlborough, in the Co. of Middlesex gent. deceased. Of his own free will and accord and with the consent of Benj'n Woods, of Marlborough, in county aforesaid, his guardian, doeth put and bind himself to be an apprentice unto Benj'n Gott, in county aforesaid, physician, to learn his art, trade, or mystery and with him the said Benj'n Gott, after the manner of an apprentice, to dwell and serve from the day of the date hereof, for and during the full and just term of five years and 4 months next ensuing and fully to compleat and ended. During all of which said term the said apprentice his said master and mistress honestly and faithfully shall serve; their secrets keep close; their lawful and reasonable commands everywhere gladly, do and perform. Damage of his said master and mistress he shall not wilfully do; his master's goods he shall not waste, embezel, purloin or lend unto others, nor suffer the same to be wasted or purloined; but to his power shall forthwith discover and make known the same to his master and mistress.

Taverns nor alehouses he shall not frequent, or cards or dice or any other unlawful games he shall not play. Fornication he shall not commit, nor matrimony contract with any person during said term. From his master's service he shall not at any time unlawfully absent himself, but in all things as a good, honest and faithful servant and apprentice shall bear and behave himself towards his said master during the full Five Years and Four Months, commencing as aforesaid.

And the said Benj'n Gott for himself doeth covenant promise grant and agree unto and with his said apprentice in manner and form following. That is to say, that he will teach the said apprentice or cause him to be taught by the best ways and means that he may or care, the trade, art or mystery of a physician, according to his own best skill and judgment (if the said apprentice be capable to learn) and will find and provide for and unto said apprentice good and sufficient meat, drink, washing and lodging during said term both in sickness and in health; his mother all said term finding said apprentice all his clothing, of all sorts, fitting for an apprentice during said term; and at the end of said term to dismiss said apprentice with good skill in arithmetick, Latin and also in the Greek grammar.

In testimony whereof, the said parties to these present indentures have interchangeably set their hands and seals the eighth day of January, in the Fourth year of the reign of our souveragn, Lord George, Ye Second, by the Grace of God, of Great Britain, France & Ireland and in the year of our Lord one thousand seven hundred and thirty-three-four.

As early as 1647 Massachusetts made the legal provision that students of medicine "may have the liberty to reade anatomy and to anatomize once in four yeares, some malefactor, in case there be such as the Courts shall allow of." But there was almost no opportunity for "anatomizing" or even to witness dissections, and not even the preceptors knew anatomy.

At the end of the first third of the Eighteenth Century new hospitals were built in London. Guy's was added to St. Bartholomew's, with the aid of Richard Mead, who at that time was in possession of the Gold-Headed Cane. The Royal Infirmary in Edinburgh and other hospitals were built and the staffs of these institutions soon gained renown. By that time some of the Americans who had graduated from Harvard, King's College and William and Mary, and who had completed apprenticeships with the more outstanding physicians in this country, elected to pursue their studies further and went to Edinburgh, Leyden, Paris and other places. Many remained in England and few returned.

It is to the few young men who did return that the first real awakening in medicine in this country is due. Having seen the best medicine in Europe, they were determined to raise the standards in this country.

John Kearsly had come to Philadelphia in 1711 and trained as apprentices William Shippen and John Bard, whose sons in turn studied medicine. William Shippen, Jr., spent five years as an apprentice and then went to Europe to continue his studies. John Redmond, another preceptor in Philadelphia, trained John Morgan, Benjamin Rush and Casper Wistar, all of whom studied subsequently in Europe. In 1765, these three became professors in the Philadelphia Medical College, later the School of Medicine of the University of Pennsylvania. Morgan and Shippen served as General George Washington's Surgeons General, and Benjamin Rush signed the Declaration of Independence.

Benjamin Rush says that in the more than five years of his apprenticeship (February 1761 to July 1766) he was absent only 11 days and only three evenings. He prepared medicines, visited the sick, performed the offices of a nurse and kept books and accounts. He found the confinement conducive to business and study and, to quote him, "[the duties] produced in me habits of industry and business which never left me."

A similar group in New York founded King's College, later the College of Physicians and Sur-

geons of Columbia. Harvard Medical School was started in 1783.

In this same year the University of Edinburgh Medical School, which was begun in 1726, required a three-year medical course, one year of which had to be in residence in Edinburgh.

The first permanent hospital in the colonies was the Pennsylvania Hospital, founded in 1751 by Thomas Bond with the aid of Benjamin Franklin. By 1765 a faculty had been assembled at the College of Philadelphia with William Shippen, Jr., in Anatomy, Surgery and Midwifery (admission was by card signed by Shippen for a fee of 20 pistoles —$24.00); John Morgan in Botany and Chemistry; Thomas Bond in Clinical Lectures and Benjamin Rush in the Theory and Practice of Physic. It was assumed from the beginning that clinical teaching would be carried on in the Pennsylvania Hospital.

The M.D. degree required three years but very few students took the Doctor of Medicine course, as the course for the degree of Bachelor of Medicine was much shorter.

These activities in the colonies were concomitant with the periods of Richard Mead and Anthony Askew.

Gradually the apprenticeships were liberalized. The apprentices lived outside the preceptor's home and paid a fee in lieu of rendering service. The apprenticeship system of medical education lasted well into the Nineteenth Century, although the loss of confidence in the system increased steadily. About one hundred years ago fully 80 per cent of the practitioners in America had never been in a medical school.

Nevertheless, as the abuses in the apprentice system increased and as the public lost faith in the healers, the attendance in medical schools began gradually to increase. Even in the schools, standards were low, as many were proprietary or purely commercial and new schools were appearing rapidly. There were no admission requirements except the fee; and in some there were no examinations. A group of practitioners could form themselves into a faculty, whether qualified or not, acquire a building and, however inadequately equipped, get a license and run a medical school as a sideline to their practice. The fees went into their pockets, and while some of these medical schools had connections with universities, they were the loosest sort of affiliations. Many had no connections whatever with a college or university. In the beginning the required courses covered six to eight months. This grew to two years but the terms were only four months in each year. In many schools the same lectures were repeated in the second year.

The important point to observe in this situation is that medical education and the practice of medicine were *in statu quo*. The medical faculties seemed content to have it remain there. There were very few serious attempts to advance knowledge in the field, and the type of education determined the type of practice and quality of medical care. Both left a great deal to be desired. The medical educators not only did not themselves bring about changes for the better, they resisted change in any form. And this resistance seems to have been a characteristic of medical educators until comparatively recent times. Many of the important progressive changes in medical education have been instigated by persons or forces outside of medicine.

The American Medical Association was founded in 1847 and it made efforts to improve the state of medical education, at first without much effect. It was at about this time that Dr. Hugh Huger Toland established the first medical school to survive in California. The Toland Medical College, as he called it, came into being in 1864. It affiliated with the University of California in 1873 to become the University of California Medical School.

One of the most striking instances of action from outside occurred at Harvard in 1869 when Charles W. Eliot became president at the age of 35. He began immediately to attend and preside at the medical faculty meetings, a new experience for the medical faculty. In his first annual report he said, "The whole system of medical education in this country needs thorough reformation." He began immediately to work toward this end and, of course, ran into very stubborn resistance from the faculty. Here again that resistance to change showed itself. Oliver Wendell Holmes, the poet, then professor of Anatomy, at first opposed Eliot's reforms but later supported them in a half-hearted way. Holmes wrote, "He [Mr. Eliot] comes to the meeting of every faculty, ours amongst the rest, and keeps us up to eleven and twelve o'clock at night discussing new arrangements. I cannot help being amused at some of the scenes we have in our medical faculty—this cool, grave, young man proposing in the calmest way to turn everything topsy-

turvy, taking the reins into his hands and driving as if he were the first man that ever sat on a box. I say amused, because I do not really care about most of the changes he proposes, and I look on it a little as I would at a rather serious comedy. 'How is it, I should like to ask,' said one of our number the other evening, 'that this faculty has gone on for eighty years, managing its own affairs and doing it well—for the medical school is the most flourishing department connected with the college (sic)—how is it that we have been going on so well *in the same orderly path for eighty years,* and now within *three* or *four* months it is proposed to change all our modes of carrying on the school—it seems very extraordinary, and I should like to know how it happens.' 'I can answer Dr. Bigelow's question very easily,' said the bland, grave, young man. 'There is a new president.' "

Before Eliot became president there had been no requirements for admission and many of the students could scarcely read or write. The fee was the only requirement. The medical course had been three winter terms of four months each—a total of one year. Lectures and courses were haphazard and repetitive. Oral examinations were held, and the student had to pass five out of nine subjects to get a diploma. He then went without further training into practice. President Eliot put in entrance requirements, increased the three terms to nine months each, made the courses progressive rather than haphazard, and required written examinations in which the student had to pass all courses. This epochal change was gradually adopted by a few other medical schools, but the many commercial and proprietary schools were not interested and most schools were without standards into the early part of the Twentieth Century. Medical men resisted change.

Then many drastic changes began to occur with the appearance of laboratories in departments of biochemistry, pathology and physiology. Medical research began to raise its head. The Johns Hopkins Medical School was opened in 1893 with the requirement of a bachelor's degree for entrance.

In 1910 medical education was shaken to its roots by the publication of Abraham Flexner's report of a study that was carried out at the request of the American Medical Association. Here again a non-medical individual's study and recommendations for reforms of medical education resulted in a veritable revolution. The commercial and proprietary schools dropped out of existence, the relationship of medical schools to their universities became firm, standards rose, school and hospital relationships improved, a scientific base for medicine was started and financial support of medical education by foundations and generous individuals made the renaissance of medical education a reality.

The sweeping changes brought about by The Flexner Report helped prepare the medical schools for the great awakening they were about to experience, namely, the beginning and rapid increase of research in medicine.

Many schools began to institute the full time system for their faculties, which made it possible for them to devote a great deal of time to research. As a result a steadily increasing mass of new medical knowledge was forthcoming. World Wars I and II brought into sharp focus many of the shortcomings and needs in medicine, and this led directly to the outpouring of federal funds for research. Before World War II funds for medical research were, relatively speaking, a trickle. Now the stream from the Federal Government has become a torrent.

As a result, whole groups of diseases have been conquered and the burgeoning mass of medical knowledge has become so great that no student can master it and no faculty member can teach it.

This has led to another stupendous but healthy change in medical education; but this time medical educators themselves are making the change, which is still very much in progress. Many schools are looking with a severely critical eye at the content and methods employed in their curricula. A number have made radical changes and more are in the making.

Another change is occurring which concerns you who are entering upon your medical careers, and you must without delay prepare to play your role in guiding it lest forces outside of medicine seize control of it—which they stand poised to do.

Medical knowledge has been and is continuing to increase with such rapidity that those engaged in medical research are focusing their attention on narrower and more circumscribed fields and studying these in greater depth. As an example, when I was in medical school, investigators were trying to identify the hormones produced by the pituitary gland. Today they are unraveling the molecular structure of the growth hormone. Of this you in this school are well aware. This trend in medical research, to study narrower fields in greater depth,

has carried over into the clinical field and one finds clinicians acquiring greater knowledge in narrower or more limited fields—in other words, specializing.

A definite trend is now obvious, namely, more and more young physicians are becoming specialists and fewer are going into internal medicine, pediatrics and general practice. If this trend continues, family physicians will be scarcer and scarcer and patients will have to determine for themselves which specialist to consult. This will lead to chaos, and is wholly unfair to those whom the profession serves. While the profession thus splinters itself into narrower and narrower specialties the patient remains a whole human being, and more than ever before will need a wise physician to whom he can turn. This physician must be able to render comprehensive and continuing health care to his patients and, therefore, must have a broad and sound knowledge of internal medicine and access to all medical services in this community. He will serve as the counselor to the patient and his family. He will arrange for consultations with specialists or for care in a hospital, turning over responsibility when indicated, but retaining an overall responsibility. He can work informally or formally with a group of physicians, but would be the physician of first contact. His training must be broad and thorough enough to give him stature equal to that of any specialist. His importance at this time cannot be overestimated, for his patients will expect him to assume overall care of them, coordinate the opinions of consultants if they are needed, and in the end solve the patients' problems. His responsibility will be the continuous maintenance of health.

One important contributing factor to the serious if not alarming situation is the fact that the great increase of research in medical schools has moved with such speed and has so occupied the attention of medical educators that medical care in the broad sense has lagged as a result. Don't misunderstand me. The research has brought untold benefits, and it must not be curtailed, although greater emphasis on quality than on quantity might be considered. But medical care must not suffer; indeed it must be brought abreast of research, and this without delay.

In some medical schools there has been so much concentration on the research programs that the faculties are made up only of men whose prime interest is in research. As a result the students have only these men as models. Very few medical schools or university hospitals today have comprehensive medical care clinics or adequate facilities for exemplary teaching of comprehensive continuous medical care for their students or for furnishing models for such care to the community. The great majority of medical students go into practice, and it is imperative that adequate opportunities be given them for preparing themselves for this field. A few medical schools and university hospitals are moving rapidly to correct this situation, but unless correction can be made without delay, communities and forces outside of medicine will act.

Having grown up in the clinic of Francis Peabody, I had the opportunity of seeing the care of the patient at its best. His simplicity, humility and true spirit of service, together with an inborn sense of compassion, were examples that one doesn't forget. And I have come to believe that these traits are essential for the truly great physicians. Steeped as you are in the art and science of medicine, you can be assured that a rewarding and happy career lies before you, but only if you realize that at this point your education is beginning anew and that your desire to learn must continue. Medicine is ever changing; it has changed in the past, is changing at present and will change in the future. To meet this challenge you must cherish your capacity to change with it.